



Photo: C. S. N. Bailey, NPS

## Seabirds

# 'Ua'u or Hawaiian petrel

*Pterodroma sandwichensis*

### SPECIES STATUS:

Federally Listed as Endangered

State Listed as Endangered

State Recognized as Indigenous

NatureServe Heritage Rank G2/T2 -

Species Globally Imperiled/Subspecies Locally Imperiled

IUCN Red List Ranking - Vulnerable

Regional Seabird Conservation Plan - USFWS 2005

**SPECIES INFORMATION:** The 'ua'u or Hawaiian petrel is a medium-sized, nocturnal gadfly petrel (Family: Procellariidae) endemic to Hawai'i. The name is derived from a commonly uttered call, heard at colonies. Adults are uniformly dark grayish black above forming a partial collar which contrasts with white throat, forehead, and cheeks; entirely white below except for black tail and leading and trailing edges of underwings. Owing to darkness of back color, the 'W-pattern' across back and upper surface of wings is not visible except in worm plumage. Bill black, and legs and feet mostly pink. Even during the breeding season, 'ua'u often feed thousands of kilometers from their breeding colonies, usually foraging within mixed-species feeding flocks over schools of predatory fishes. They feed by seizing prey while sitting on the water or by dipping prey while flapping just above the ocean surface. In Hawai'i, they feed primarily on squid, but also on fish, especially goatfish and lantern fish, and crustaceans. 'Ua'u nest in colonies, form long-term pair bonds, and return to the same nest site year after year. Colonies are now typically in high-elevation, xeric habitats or wet, dense forests, although before the arrival of the Polynesians and their associated animals these birds nested in the lowlands, too. They nest in burrows, crevices, or cracks in lava tubes; nest chambers can be from 1 to 9 meters (3-30 feet) deep. Most eggs are laid in May and June and most birds fledge by December, although there are significant inter-island differences in breeding phenology; for example, the nesters that are earliest by more than a month reside at the summit of Haleakala Volcano. Both parents incubate the single egg, and brood and feed the chick. Birds first breed at five to six years of age.

**DISTRIBUTION:** Nests among the Main Hawaiian Islands (MHI) including Maui, Hawai'i, Kaua'i, Lāna'i, and possibly on Moloka'i. Subfossil evidence indicates that prior to the arrival of Polynesians, 'ua'u was common throughout the MHI. At sea, they occur throughout the central tropical and subtropical Pacific Ocean.

**ABUNDANCE:** In the early 1990s the population was estimated at 19,000 individuals with a breeding population of 4,500 to 5,000 pairs, although inaccessible nesting locations make accurate counts difficult. Analysis of at-sea counts indicate broad consistency with the island-based estimates. More recently (1998-2011) the global population was estimated at 52,000 birds,

although due to differences in sampling methods it is unknown whether these higher numbers reflect a population increase or a difference in the proportion of the total population sampled. More than 1,800 individuals occur at Haleakalā National Park on Maui (a few hundred more nest in West Maui), around 150 pairs occur on Mauna Kea, Hawai'i; around 1,600 pairs occur on Kaua'i; several thousand birds occur on Lāna'i; and potentially around 50 pairs nest on Moloka'i.

**LOCATION AND CONDITION OF KEY HABITAT:** Nests in a variety of remote, inland habitats. On the islands of Hawai'i and Maui, colonies are located above 2,500 meters (8,200 feet) in xeric habitats with very sparse vegetation, with most nests in existing crevices in the lava. On Kaua'i and Lāna'i, and West Maui colonies occur in lower-elevation forests dominated by 'ōhi'a (*Metrosideros polymorpha*) often with a dense understory of uluhe fern (*Dicranopteris linearis*). At sea, they are pelagic and occur over the open ocean.

#### **THREATS:**

- Historical hunting. Nestlings were considered a delicacy by Polynesians, and were harvested from nest burrows, including artificial ones constructed by the Polynesians. Adults were netted as they returned to colonies, and smoky fires were sometimes lit along flight corridors to disorient and ground birds.
- Introduced predators. Adults and chicks are susceptible to depredation by dogs, pigs, rats, barn owls, feral cats, and the small Indian mongoose. The presence of these destructive introduced animals, the main force behind population decline, has relegated the species now to nest only in remote interior areas, at very high altitude, or on islands that are predator-free.
- Feral ungulates. Feral goats (*Capra hircus*), mouflon sheep (*Ovis musimon*), and potentially axis deer (*Axis axis*) trample burrows and degrade nesting habitat.
- Artificial lighting. Street and resort lights, especially in coastal areas, disorient fledglings, causing them to eventually fall to the ground exhausted or increasing their chance of colliding with artificial structures (i.e., fallout) such as powerlines. Once on the ground, fledglings are killed by cars, cats, and dogs, or die of starvation or dehydration.
- Collisions. Adults and fledglings are susceptible to mortality from collisions with obstacles such as communication towers, utility lines, fences, and wind farm structures while commuting between inland nest sites and the ocean at night.
- Colony locations. The remoteness of colonies, as well as the habitat in which they occur (e.g., steep terrain or dense forest), complicates predator and ungulate eradication or control.

**CONSERVATION ACTIONS:** Past actions directed at 'a'o (Newell's shearwater [*Puffinus auricularis*]) have often benefited 'ua'u populations. These actions include the rescue and rehabilitation of downed fledglings by the Save Our Shearwaters (SOS) program and efforts to shade and curtail resort and event lighting and streetlights. Current and future conservation efforts on Kaua'i to benefit should include efforts to reduce and shield lighting, control predators and invasive species at breeding colonies, conduct surveys to locate and characterize additional colonies, evaluate updated population estimates, and implement management actions appropriately. Actions being carried out in association with several Habitat Conservation Plans, along with State and federal recovery efforts are resulting in conservation benefits to 'ua'u on Maui, Lāna'i and Kaua'i; these include efforts to protect existing breeding populations and establish new colonies using predator-proof fencing, predator control,

ungulate control, social attraction, and translocation work plans. In addition to these efforts, future management actions specific to 'ua'u populations should include the following:

- Continue predator and ungulate control at colonies on Hawai'i, Maui, Lāna'i, and Kaua'i, and potentially at offshore islets that contain suitable nesting habitat.
- Locate additional breeding colonies on Lāna'i, Hawai'i, Maui, and Kaua'i and perform surveys on Moloka'i, Lāna'i, and Kaho'olawe to assess 'ua'u presence on these islands.
- Continue to identify fallout areas and minimize effects of powerlines and artificial lights.
- Continue to support the SOS program, particularly public outreach about light attraction and fallout, the rescue and rehabilitation program, and the establishment of similar programs on other islands where appropriate.
- Re-establish/expand breeding colonies by identifying suitable candidate locations for social attraction and/or translocation, and continue to refine translocation protocols.

**MONITORING:** Continue at-sea and terrestrial surveys in known and likely habitats to evaluate the population size and status, and to locate unidentified breeding colonies. Monitor breeding incidence, breeding density, reproductive success, causes of mortality, population trends, return rates and effectiveness of management at breeding colonies. Assess the efficacy of predator control efforts.

**RESEARCH PRIORITIES:**

- Develop and implement standardized survey and monitoring protocols that can be used throughout Hawai'i to better estimate population parameters and changes.
- Expand and refine radar studies to monitor population trends, locate colonies, investigate behavior, determine geographic variability in threats, and evaluate the effectiveness of conservation measures.
- Conduct long-term demographic studies to evaluate reproductive success, breeding incidence, breeding density, colony boundaries, population trends, and survival rates.
- Develop, refine, and monitor the outcome of conservation actions and measures that are employed to avoid and minimize impacts from flight collision and other causes, and broaden adaptive management approaches.

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